

A New Prescription: Pollution Prevention Strategies for the Health Care Industry

Wednesday October 7, 1998

Boston University Corporate Education Center
Tyngsborough, Massachusetts

Proceedings

Section 1: Executive Summary and Plenary Session

Table of Contents

<u>Executive Summary</u>	6
<u>Plenary Session:</u>	
Laura Brannen, <i>How to Make Changes – A Panel Discussion</i>	8
Gary Cohen, <i>The Campaign for Environmentally Responsible Health Care</i>	Section 1a

A New Prescription: Pollution Prevention Strategies for the Health Care Industry

Wednesday October 7, 1998

Boston University Corporate Education Center
Tyngsborough, Massachusetts

Proceedings

Sponsored by:

*Massachusetts Executive Office of Environmental Affairs
Office of Technical Assistance for Toxics Use Reduction*

Massachusetts Department of Environmental Protection

Massachusetts Strategic Envirotechnology Partnership

Massachusetts Water Resources Authority

Medical Academic and Scientific Community Organization

U.S. Environmental Protection Agency – New England

About the Sponsors:

Massachusetts Executive Office of Environmental Affairs, Office of Technical Assistance for Toxics Use Reduction (OTA) provides manufacturers and institutions that use toxic materials with non-regulatory, confidential technical assistance on opportunities to reduce the use of toxic materials or the generation of toxic byproducts. 100 Cambridge Street, Room 2109, Boston, Massachusetts 02202. Phone: (617) 727-3260. Fax: (617) 727-3827. Web Page: [Http://www.magnet.state.ma.us/ota](http://www.magnet.state.ma.us/ota).

Massachusetts Department of Environmental Protection (DEP) is the state agency responsible for ensuring clean air, water, and land through pollution prevention and toxics use reduction, safe management of solid and hazardous wastes, timely cleanup of hazardous waste sites and spills, and preservation of wetlands and coastal resources across Massachusetts. 1 Winter Street, Boston, Massachusetts 02108. Phone: (617) 292-5500. Web Page: [Http://www.magnet.state.us/dep](http://www.magnet.state.us/dep).

Massachusetts Strategic Envirotechnology Partnership (STEP), supports the growth of new environmental and energy efficient technologies in Massachusetts by offering a full range of coordinated state services to reduce the uncertainties leading to the successful commercialization of such innovative technologies. 100 Cambridge Street, Room 2000, Boston, Massachusetts 02202. Phone: (617) 727-9800. Web Page: <http://www.magnet.state.ma.us/envir/oea>.

Massachusetts Water Resources Authority (MWRA) supplies water to 46 municipalities and provides wastewater treatment services to 43 communities and 5500 businesses in the Greater Boston area. MWRA sponsors workshops, joint research projects with industry and innovative toxics control programs to encourage homeowners and industrial users to practice pollution prevention. Charlestown Navy Yard, 100 First Avenue, Boston, MA 02129. Phone: (617) 242-6000. Web Page: <http://www.mwra.state.ma.us>.

Medical Academic and Scientific Community Organization (MASCO) is a charitable corporation established to develop and provide support programs of a shared-service nature for our member institutions that help them to function in a more effective and efficient manner. Our member institutions include world-class medical and educational institutions located in the Longwood Medical and Academic Area (LMA) of Boston. MASCO offers a wide range of services, including group purchasing and shared service contracting for telecommunications, parking and transit, area planning and development, government and community relations, security, building management and child care. 375 Longwood Avenue, Boston, Massachusetts 02215. Phone: (617) 632-2310. Fax: (617) 632-2759. Web Page: [Http://www.masco.org](http://www.masco.org).

U.S. Environmental Protection Agency - New England (EPA-Region I) is the federal agency serving Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island and Vermont whose mission is to protect human health and safeguard and improve the natural environment. One Congress Street, 11th Floor Boston, Massachusetts 02203. Phone: (617) 565-3300. Web Page: <http://www.epa.gov/region01>.

About the Conference:

Since 1989 the Toxics Use Reduction Act of the Commonwealth of Massachusetts has required that manufacturing facilities that use large quantities of toxic chemicals must draw up plans for reducing toxics use. The Act also established the Office of Technical Assistance, to provide pollution prevention assistance to these facilities and to others that use toxic materials.

In 1997 the Massachusetts Toxics Action Center in conjunction with Physicians for Social Responsibility, held a Roundtable conference on Reducing Hospital Waste. Although OTA has provided assistance to several medical facilities, the event prompted the office to expand its efforts to promote toxics use reduction to this sector.

OTA then sought and received a grant from the U.S. Environmental Protection Agency to conduct this conference. MWRA, MASCO, DEP and STEP immediately agreed to participate, and EPA staff has continuously participated as well. During the past year, the partner organizations have jointly issued a call for papers, designed a survey for attendees, produced proceedings to be distributed at the conference, organized vendor exhibitions and contacted relevant agencies and organizations. Medical facilities are subject to many of the same environmental requirements as faced by heavy industry. The point of this conference is that there is much that medical facilities can do to reduce their own impact on the environment. By putting so much time and energy into this conference, and joining with OTA to provide assistance, enforcement agencies are clearly emphasizing the value of a cooperative approach. Please use this conference as a resource, and contact any of the partner organizations for further information. Speaker contact information is also included at the end of each paper.

Acknowledgements

At this time we would like to thank the following people for putting this conference together. Secretary Trudy Coxe, Barbara Kelley - Director of OTA, Rick Reibstein - Assistant Director of OTA, Scott Fortier, Lara Sutherland, Joe Paluzzi, Susan Lanza, Christopher MacIsaac, Sayaka Yamaki, Cynthia Barakatt, Audrey Tyler, and Timothy Karcz also of OTA, David Eppstein of MASCO, David Struhs – Commissioner and Judy Shope of the Massachusetts DEP, Kevin McManus – Director TRAC Division, Karen Rondeau, David Drain, and Walter Schultz of the MWRA, Lee McMichael and Abby Swaine of the U.S. EPA, and Evelyn Bain and Denise Garlick of the Massachusetts Nurses Association.

Cooperating Organizations

OTA would also like to thank the following cooperating agencies for their efforts in assisting with the preparations for this conference:

- *Baystate Clinical Lab Managers Association*
- *Greater Boston Physicians for Social Responsibility*
- *Health Care Without Harm*
- *Massachusetts Hospital Association*
- *Massachusetts Nurses Association*
- *New Hampshire Hospital Association*

Executive Summary

Medical facilities currently face substantial challenges to keep costs down, elevate the quality of care, compete in the market place, and comply with increasingly stringent and varied regulations. Recently, environmental regulatory agencies have stepped up enforcement efforts aimed at the medical and dental sector; at the same time, growing environmental awareness among local communities has pressured hospitals to pay more attention to these issues.

Pollution prevention (P2), defined as reducing the amount of toxic material going into a process from the beginning, is the key to minimizing the environmental impact of any operation. Eliminating the use of particular toxic substances can make the process safer for the health care professionals, the patients, and the environment. Changing a procedure to create less toxic waste can also save money through decreased disposal, transportation, and purchasing costs.

Because pollution prevention measures are not end-of-pipe solutions, all health care professionals and support staff must participate in the implementation of these changes. Here we present the experience of people who work in health care and have been involved in the implementation of pollution prevention programs at various types of facilities--dental offices, large hospitals, clinical laboratories, and smaller facilities.

The first papers provide an overview of environmental issues related to health care facilities and address current available solutions. Evidence indicates that medical facilities are significant sources of mercury and dioxin in the environment. Many replacement technologies are available, including mercury-free equipment and PVC-free supplies. Strategies such as waste auditing, employee education, and changed purchasing decisions have been implemented at a variety of facilities and can be used to make a significant and measurable change in the environmental impact of medical and dental care.

The facility-based papers cover a wide range of topics, including strategies for determining structural sources of mercury, procedures for initiating behavior change, and detailed descriptions of facility-wide programs for waste minimization and pollution prevention. Facility-wide cooperation must be achieved for a pollution prevention program to achieve success. Clinical staff must be consulted before supplies and equipment can be replaced. Alteration of waste segregation procedures at the source also requires the participation of all personnel.

Clinical laboratories use a myriad of reagents, many of which contain toxic chemicals as ingredients or contaminants. Strict analysis of contaminants in reagents may be required to assess the environmental impact of disposing of spent reagents. Because the accuracy of diagnostic tests is paramount, replacing reagents must be accompanied by validation testing and training of personnel. Although these procedures may seem prohibitively complex, many laboratories have already accomplished significant reduction in the use of reagents containing toxic chemicals.

Dental procedures involving amalgam can introduce mercury into the wastewater coming out of an office as well as generate significant heavy metal waste. Successfully reducing the amount of mercury entering the environment from dental offices requires the combination of upstream

pollution prevention procedures as well as end-of-pipe controls. Cooperation between local wastewater treatment facilities and dental offices can lead to successful solutions to the mercury problem.

The development of effective management and education programs can be crucial in implementation of pollution prevention programs. Tools such as Total Quality Management (TQM) can be used to reduce waste and ensure compliance with new pollution prevention policies and procedures at any facility.

A resource list is included in the proceedings to aid all those who wish to implement pollution prevention programs at their office, facility, or organization. Web Sites, technical assistance providers, resource centers, relevant organizations, articles, books, and periodicals are all included and organized by topics. This publication is intended to help all interested persons and organizations institute wide-ranging pollution prevention programs, and ultimately reduce the environmental impact of all health care operations.

Laura Brannen
Waste Minimization Coordinator
Dartmouth-Hitchcock Medical Center (DHMC)

How to Make Changes - A Panel Discussion

Why Do Healthcare Facilities Need A Waste Management Program?

The DHMC new employee orientation “Environmental Programs” talk begins with a tour of the Waste Management Center with dazed new staff asking, “Why are they dragging me down here on my first day at work?” Then I explain that everyday tons of trash pass through these doors. Everyday, a ton of infectious waste is autoclaved and “managed,” tons of paper are shredded, and a ton or so of beverage containers, batteries, light bulbs and other recyclables is sorted. These new employees start to shake their heads in understanding as I explain that every one of them has some responsibility for the waste and recyclables that enter this room.

We go back to the conference room where we continue to talk about the need for hospitals to “change the culture” in waste management. No longer is an “out-of-site, out-of mind” approach to waste management appropriate for health care. It is time for the industry to take some responsibility in managing the mounds of waste it generates, and even more importantly, reducing the *toxicity* of that waste. It is time for health care to make the connection that pollution prevention is preventative medicine for the environment. The new staff nod their heads in agreement.

If It's Such a Good Idea, Why Isn't Everyone Doing It?

That’s a good question, and one I hope time will address when the industry catches on and everyone IS doing it! But there have been several barriers in making the shift. An important one is that, at least in most states, many of these “environmental programs” are not compliance driven. Our jobs as waste managers would be much easier if state or federal regulations dictated recycling and waste minimization programs. But these programs are “overhead” – non-clinical programs that are often the first to get scrapped in budget cuts or the last to get started when weighted against clinical priorities. It’s a tough sell.

The fact is, however, that waste management programs are cost effective. Take red bag waste reduction for example – major health care facilities that have embarked upon reduction initiatives to reduce this costly waste stream have saved money. I won’t get into a detailed analysis, but the data is available and the savings speak for themselves. As waste managers, most of us are trash pickers from way back and we know what’s going out the door. We are in an excellent position to address the instances where we are literally tossing resources – and then address work practice issues to reduce the unnecessary disposal of these resources. There are many examples. Monitoring infectious sharps containers, we found usable instruments disposed in the containers. Working with Central Sterile Reprocessing, we put together an education program to “eliminate” this practice. We also found unopened medical supplies in the trash.

Laura Brannen
Waste Minimization Coordinator
Dartmouth-Hitchcock Medical Center (DHMC)

Nurses, unit assistants and housekeepers used to toss all the supplies left in a patient room at discharge, whether they were open or not. Working with a nursing task force, we developed guidelines for medical supplies disposition: what should be restocked, what is appropriate for 3rd world distribution and what must be disposed.

Actually, there is an important point to be made -- not all environmental programs are cost effective, like disposing of hazardous wastes, or fluorescent light bulbs, or batteries. At an average disposal cost of \$3000/ton, hazardous waste is clearly expensive. Sure we can minimize the costs with reduction initiatives (another job for an environmental manager), but these are the costs of doing business. We need to expand this notion beyond compliance.

Other Barriers?

Old paradigms regarding how purchasing decisions are made may be barriers to choosing more environmentally sound products. It's the bottom line vs. life cycle analysis. For example, a mercury thermometer may only cost \$1 (or less), but we must include not only the actual disposal costs for that same thermometer (\$2-\$4 per) but also the environmental and human health impacts. And what are the costs of a mercury management program, or of cleaning a broken thermometer? Taking these other considerations into account, purchasing a \$5 digital or other more expensive devices doesn't seem so unrealistic.

Group purchasing organizations (GPOs) – are they a barrier? When we would like to consider an alternative product but we've just signed an 8-year contract on a variety of products, that's a barrier. But if the industry, collectively, demands that GPOs supply environmentally sound products in terms of reduced toxicity, appropriate packaging, reasonable disposal options, maybe this current barrier can be an opportunity.

And Besides, Who is Going to Do It?

Waste Managers come from Housekeeping, Engineering, Safety, Facilities, or from the clinical side. The field is too new and the jury is still out on the "best" system. There are many niches for people to fill -- housekeeping and engineering departments are more likely to be involved developing and managing recycling and waste management programs. Hazardous waste technicians or safety folks can address toxicity issues while nurses and clinicians may focus on how work practices impact the environment and consequently affect public health issues. In a "perfect" system, they all take some ownership of and support all programs. The most successful programs, however, are those that have a dedicated waste or environmental programs manager.

Laura Brannen
Waste Minimization Coordinator
Dartmouth-Hitchcock Medical Center (DHMC)

Start on the Path of Least Resistance – But Start Somewhere and Start Now!

Where to start or where to expand is difficult to definitively advise. Obviously, the decisions are based on resources, the culture of your facility and community, or even what is happening at the state regulatory level. While the “health care without harm” focus is on reducing the toxicity of hospital waste, some facilities may find it easier to implement recycling and general waste management programs first. Since all staff generate waste, and many recycle in their communities, recycling and waste minimization is a language that is familiar and thus may be easier to get off the ground. A hospital may be more likely to be receptive to “enhanced” programs like pollution prevention initiatives if they have successful waste management programs. They do overlap, however, and ideally can happen simultaneously. The “sustainable hospital model” certainly incorporates any environmental initiative – where you start may just depend on where you find the path of least resistance.

There are two basic approaches to developing a dedicated “environmental program.” Both have been tried and so far, both are working. The first is the “top down” model. First administrative support is garnered. An environmental mission statement is written and implemented, strategies for improvement are planned, and then the programs are implemented.

The second approach is more the “bottom up” model where Housekeeping, for instance, may take the lead in starting a recycling program, or Dietary may start a composting program. Other potential programs are prioritized and implemented as resources allow. Successes are documented and the programs grow to the point where a facility-wide mission statement that fits the current level of commitment is developed and programs are expanded accordingly.

Ask Questions, Get Educated – Make Changes

Where do you start? A simple waste audit should be conducted to find answers to some of the following questions to find the areas where improvement can be achieved most easily or where the biggest benefits can be realized.

- What are the volumes of all major waste streams: solid waste, recycling, infectious waste, and hazardous waste?
- How much medical waste is generated? How is it treated? What are the source segregation programs in place?
- Hazardous Waste Management Program - who is responsible (who signs the manifests)? Does your facility have a hazard communication policy that addressed hazard reduction?
- Where is mercury being used (thermometers, sphygmomanometers, chemicals, Miller Abbot Tubes, bugies, dilators)? How is it disposed? Do we have a Mercury Management Policy? A spill clean-up procedure?

Laura Brannen
Waste Minimization Coordinator
Dartmouth-Hitchcock Medical Center (DHMC)

- What about batteries? Fluorescent light bulbs?
- PVC: what products contain PVC? How are they disposed?

Medical Waste Disposal

Other authors explore the negative impacts of incineration of medical wastes on human health and the environment. I will not elaborate beyond the fact that incineration is no longer the preferred method of treatment - alternatives exist that are less harmful, and more cost effective. Making the right choice between the alternatives, such as thermal and chemical treatment, autoclave, microwave, high temperature electric arc, and shredding technologies, will depend upon the following parameters:

- Technology – Is there confidence in the current technology? What is the track record of the technology, company, and servicing? Check references.
- State regulations – check local regulations from landfilling to air testing. Some states require shredding technologies after treatment.
- On-site or off-site treatment – preference for on-site treatment for instance, may limit choices but may also be cost effective if local choices are limited, or hauling costs are prohibitive.
- Operations – Check safety and maintenance records. For off-site alternatives, thorough site assessments are critical – does the company have any violations? Environmental issues – consider air, water emissions, and compliance testing costs
- Cost Benefit Analysis – As well as the obvious considerations (testing costs, compliance costs, energy, labor, hauling, etc.), if you're generating more than 15% medical waste, include medical waste minimization savings in the benefit analysis. Not that you couldn't do minimization even if you didn't change technology – but these savings bringing the generation rate to 15% could be substantial and should be part of the analysis.

DHMC Experience

DHMC operated an on-site incinerator at its new site from 1990-1995. In August of 1995, the chimney began deteriorating after its mortar between the tiles/bricks began cracking from thermal shock. In order to fire the incinerator back up, significant investment was required to re-build the chimney with appropriate air pollution devices, to comply with the new air monitoring and ash testing standards. After addressing the issues listed above, 2 - 150lb/hour autoclave units were purchased and a full-blown educational effort was underway. We reduced our generation rates from 40% to 14% saving over \$150,000 per year.

Laura Brannen
Waste Minimization Coordinator
Dartmouth-Hitchcock Medical Center (DHMC)

Education is the KEY

Employee education is the main function of any waste or environmental programs coordinator. If staff do not know the environmental or human health impacts of their actions, they are not going to comply. They need to know their individual work practices are making a difference. Physicians and nurses should know how the medical waste they generate is treated – or what the consequences of tossing a mercury filled “Miller Abbott Tube” in the garbage will be: landfilled or worse, incinerated.

Housekeepers have a big role to play – they see it all. Empower them to have a voice to help identify problem areas and assist in educating staff. Laboratory staff are an obvious target to reduce hazardous waste generation. Engineering is also a heavy user of hazardous chemicals from pesticides to paints and other chemicals. And Purchasing holds the key to materials coming in the door, and will need to be educated about their potential roles in working with vendors and manufacturers to bring in less toxic materials, less packaging, PVC free supplies, etc.

Talking Trash???

DHMC has had a great deal of success with its waste management and environmental programs – but we have not “arrived”. There is much more work to be done in the areas of PVC reduction, pollution prevention, materials reduction and reuse... the list is endless. Staff care about these programs and want to feel good about the role their community health care facility is playing in protecting their environmental health, but recognizing the demands of a busy clinic or inpatient unit, and then being asked to “reuse, reduce, recycle, eliminate...” when possible is a balancing act.

Pollution prevention is a moral obligation healthcare has to its communities. These programs are achievable, sustainable, and necessary.

***Laura Brannen** developed, implemented, and manages the Dartmouth-Hitchcock Medical Center’s waste management program. Her work includes development of waste minimization programs, recycling program implementation and ongoing development, and waste management employee education. Ms. Brannen also develops buy-recycled and pollution prevention programs, and prior to this, was the hazardous materials technician. She can be contacted at the Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire 03756. Phone: (603) 650-7488. E-Mail: Laura.F.Brannen@Hitchcock.org.*